

G. R. S. IX-5]

Previous references.

File No. 441-14

1914 .

Serial Nos.

(Gen Mis)

from 1 to 18 .

Later references.

Gen 53-19(1-3)

~~May be~~ May be preserved
in consult with
Gen Secy Secy

GENERAL AND REVENUE SECRETARIAT.

Serial Nos.

Part B for December 1916

SUBJECT.

Invention for "Improvement in Valve Gear for
Rock drilling & like machines by W. C. Stephens
Cornwall England.

Sl 18. From the Ch. Engineer Mysore Govt.

Letter No 12159 dated 2 Dec 1916

acknowledges the receipt of a copy of specification of the above invention

85
1917

GENERAL AND REVENUE SECRETARIAT.

(Gen: Mis)

NOTES.

Gen. File No. 441 $\frac{14}{15}$

FILE HEADING.

Invention for "Improvements in Valve Gear for Rock drilling and like machines" by Mr Wm Charles Stephens, Engineer of the Climax Rockdrill and Engineering Works Ltd., Carn Brea, Cornwall, England.

From

Messrs De Penning & De Penning, Calcutta.

No. 401

Dated 28. 5. 15 Received 31. 5. 15

Diary No. 10664

Enclos. 2 H.R. 47 - Spare Copies.

Serial No. /

BRIEF ABSTRACT OF LETTER.

Forward an applⁿ for leave to file a specification of the above named invention, and also a duly stamped Power-of-attorney, and remit Rs 10/- as applⁿ fees.

NOTES AND ORDERS.

1 The usual drafts are subd

ST 6.7.15

2 Issue

M. 6.7

6.7

1664
295
1664
1838

2

Serial No.	
2	To the Dir: of Mines & Geology. N ^o C 300 of 9. 7. 15 Forwards for opinion the specim ⁿ rec ^d with the above
3	To the D.C. Hy, Bangalore. N ^o 301 of 9. 7. 15 Forwards Rs 10/- rec ^d with sl 1, & requests' ackt
4	From the same. N ^o . 358 of 10. 7. 15 Acknowledges the receipt of the amount for- warded with the above.
5	From the Dir: of Mines & Geology. N ^o . 286 of 3. 8. 15 Requests that the copy of the specification and drawings may be forwarded. 3 Draft forwarding is subd SA 13/8/15 4 Issue 13/8/15 13/8
6	To the Director of Mines & Geology, N ^o . 2226 of 17.8.15 As desired in sl 5 above forwards the specification and drawings.
7	From the above. N ^o . 1838 of 20. 8. 15. With refce to sl 2 reports that the leave ap- plies for for filing the specim ⁿ may be granted. 5 The usual drafts are subd SA 30/8/15 13 The Director of Mines & & Geology is in favour of granting a patent. 7 The drafts may be approved First Member,

Sd/- Damachendrar

6/9

General and Revenue
Secretariat.

G. M. File No. 441

of 1914-15

Serial
No.

Drafts appd. by First member
m.s. Issue Mon 7.9.15

8

To Mr. Wm Charles Stephens, Cornwall. No. 3498 of 13. 9. 15

Authorises him to file a specification of the
invention.

9

To Messrs De Penning & De Penning, Calcutta. No. 3499 of 12. 9. 15

Forwards the above for commⁿ to the party concerned.

10

From the above, No. 408 of 20. 9. 15

Forward Rs 30/- and 4 copies of the specⁿ & request
the filing of the specification.

The usual drafts are subd. The Certificate at foot of
the G.O. requires signature.

L. S

IV. 42

Subd
est. 11
9.11.15

Issue

Mon

10/11

11

To, D.C. Iny. Dept. Bangalore

No. G 6000 of 15-11-15

Forwards Rs. 30/- being the fees for filing
a Specⁿ of an Invention in sl 1

12

To, The Comptroller. No. G 6001 of 15-11-15

Notifies the specification of an Invention
in sl 1

13

To Messrs De Penning & De Penning, Calcutta.

No. with reference to sl 10 forward a
copy of the notification in sl 12

4418 4p

Serial
No.

14

To, The Director of Mines & Geol
" Supdt Govt Museum
" Chief Engineer
No: G 6003-5 of 15-11-15

Forwards for record a copy of
a specification of an invention referred
to in sl 1 & requests acknowledgement.

15. From The Dy Commr Treasury Dept Bangalore
No: 60 of 17-11-15

Acknowledges the receipt of Rs 30/-
forwarded with sl 11 above.

16. From The Director of Mines & Geol.
No: 1075 of 22-11-15

Acknowledges the receipt of the Specimen
referred to in sl 14.

17. From ~~The Dy Commr~~ Supdt Govt Museum
No: 89 of 22-11-15

Acknowledges the receipt of the Specimen
referred to in sl 14.

18. The only acknowledgment due is from
the Chief Engineer (re to sl 14 above) which
will be awaited.

1/12/15 Yes
2/12/15 No

2/12

G. R. S. 12]

General and Revenue
Secretariat.

G. R. File No. 441 of 1914.

4226
4418-
4878-16

Serial
No.

13 No acknowledgement having been received a draft reminder to the Chief Engineer is submitted for approval

28/11/16

29/11/16

Issued No. 97179 of 30.11.16

18 From the Chief Engineer No. 12159 of 2.12.16

Acknowledges receipt of the specification of the invention forwarded with sl-14.

14 The Correspondence may now be filed

6/12/16

6/12/16

6/12/16

For amt Rs 107
made from 439-14

80401

3 Commercial Buildings, Calcutta

6
olive street
Calcutta

28th May 1915.

DIARY No. 60661

To

The Secretary to the Government of

His Highness the Maharajah of Mysore.

Genl & Rev Department. Bangalore

1914-1915
SECTION Gen: Mis
FILE No. 441-44

Sir,

We have the honour to forward herewith an
Application for Patent from William Charles Stephens,
Engineer of The Climax Rock Drill & Engineering Works,
Limited, Carn Brea, Cornwall. England, for
"Improvements in Valve Gear for Rock Drilling and Like
Machines".

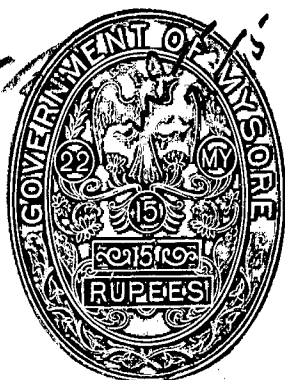
We also forward the fee thereon of Rs 10 and shall
feel obliged by the orders passed on the application
being sent to us in due course.

We have the honour to be

Sir

Your most obedient servants

J. Penning & J. Penning



In the matter of the Invention and Designs,
Regulation, 1894 of the Government of Mysore
and in the matter of WILLIAM CHARLES STEPHENS
Engineer, of The Climax Rock Drill &
Engineering Works, Limited, Carn Brea, Corn-
wall, England, an Inventor.

I, the above named WILLIAM CHARLES STEPHENS, do hereby retain,
constitute and appoint *lionel A. Debenning and Harold A
Debenning, constituting the firm of Debenning, Debenning, Patent
Agents, 3, Commercial Buildings, Calcutta. British India*
as my Agents and Attorneys to apply for and obtain from the
Government of Mysore and keep in force an Exclusive Privilege
or Letters Patent for "IMPROVEMENTS IN VALVE GEAR FOR ROCK
DRILLING AND LIKE MACHINES" and I authorise *them*
to sign my name to such papers and writings and do such acts re-
garding the same including the appointment of a substitute or
substitutes, as may be necessary or expedient.

Dated this *14th* day of *April* — 1915

Signed, Sealed and Delivered

at *15 South Street, Finsbury*
London, England
in the presence of

W. C. Stephens

John E. Dousfield
15 South Street, Finsbury, London
Chartered Patent Agent.

A. J. H. H. H.

15 South Street, Finsbury, London
Managing Clerk

2 885

G. R. S. 26]

SUBJECT.....

Diary No. of letter replied to 10661

Section flu: mi

File No. 441-14

Serial No. 2

General and Revenue Secretariat

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191 . }

No. Q. 300/one

Date of issue

9th July 15

To

The Director of Mines & Geology,

Bangalore

Signed by

Mr. H. S. R. Ray

Sir,

I am directed to forward here
with for report under Sec 6(2) of the
Mysore Inventions & Designs Regulation
No. XI of 1894, copy of a specification
of an invention for "improvements
in Valve gear for Rock drilling and
like machines" by Mr. William
Charles Stephens of Cornwall.

I have re,

100

6/7/15
For Secretary

as
in

Money sent to
19/7/15
G. R. S. 26]

2865
9

SUBJECT:.....

Diary No. of letter replied to 10661

Section Gen: Mus

File No. 441-44

Serial No. 3

General and Revenue Secretariat

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191 .

No. Q.300/R10

Date of issue 9th July 15

To

The Deputy Commr., Hy Depto,

Signed by Mr. H. A. R. R.

Bangalore

Sir,

I am directed to forward here
with a sum of Rs 10/- received from
Messrs De Penning & De Penning,
Calcutta, being application fees
payable under Schedule IV Cl (1)
of the Mysore Inventions & Designs
Regulation No XI of 1894, for leave
to file a specification of an
invention for "improvements in

over.

as
17.

Valve gear for Rock drilling and
like machines" by Mr William Charles
Stephens of Cornwall, and to request
the favor of an acknowledgment.

I have to,

Yours

6/5

Mr W. Stephens

Wm.

List of enclosures.

Copied by

Examined by

15 16

for m/s.
Rs. 10/-

Book No. 1059

358

No.

50

Bangalore District Treasury dated 10th July 1915Received from the Secretary to Government of Mysore
General Revenue Department, Bangalore

Rupees = Rs. 0/-

Annas =

and Pies =

being on account of

for Surveils and Designs Regulation No. 21 of 1894

received with docket no. 4300 dated 9-7-15

Lest 141-14-3

In charge of Treasury

Bangalore District Treasury

No. 286.

BANGALORE, 3.7.1915

DR. W. F. SMEETH, M.A., D.Sc., A.R.S.M., &c.,
Director, Department of Mines and Geology,

Mysore State.

D.M. Narasinga Rao, Esq., B.A., B.L.,
Offg. Secretary to the Government of
His Highness the Maharaja of Mysore.

SIR.

General Department

With reference to your letter No. G.299/G.M.441-14-2,
dated 9th July 1915, forwarding for report copy of Specification
of an Invention for "Improvements in valve Gear for Rock Drill
and like machines" by Mr. William Charles Stephens of Cornwall,
I have the honour to request that a copy of the drawings referred
to in the specification may kindly be forwarded to me at an
early date as the same has not been received in this office.

I have the honour to be,

Sir,

Your most obedient servant,



Director,

N.S.

Department of Mines & Geology.

14/8

G. R. S. 26]

SUBJECT.....

Diary No. of letter replied to 1164

Section *for*: *Mis*

File No. 441-14

Serial No. 6

General and Revenue Secretariat

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191

No. G 2266

Date of issue 17-8-15

To The Director of Mines & Geology.

Sir,

Signed by M - M - S - A. R. M.

As desired in your letter n°

286 of the 3rd August 1915, I am

directed to forward herewith copy

of the Specification of an invention

for "Improvements in Valve Gear for

Rock drilling and like machines"

by Mr. William Charles Stephens of

Cornwall.

I have

M. S.

13/8

For off. Secy.

pl. Secy.

Ans.

11/10
14/8/15

No. ~~435~~ 433.

BANGALORE, 20th August 1915

Encls. 4 diagrams and
2 applications.

FROM

DIARY No. 1838 DR. W. F. SMEETH, M.A., D.Sc., A.R.S.M., &c.,

Director, Department of Mines and Geology,

Mysore State.

1914-15	
SECTION	fm.
FILE NO.	441-14
SERIAL NO.	7

D. M. Narasinga Rao, Esq., B.A., B.L.,

Offg. Secretary to the Government of

His Highness the Maharaja of Mysore,

General Department.

SIR,

In reply to your letter No. G.299/G.M.441-14-2, dated 9th July 1915, I have the honour to state that I have examined the specification referred to therein and find it to be clearly described and practical. So far as I am aware the design is novel and the claims legitimate and I am of opinion that the leave applied for may be granted.

2. The papers received with letters Nos. G.299 and G.2266 -G.M.441-14-6, dated 9th July and 17th August 1915, are returned herewith.

I have the honour to be,

Sir,

Your most obedient servant,



Director,

N.S.

Department of Mines & Geology

63498

fm 441-14-8

GOVERNMENT OF MYSORE

General Department.

Register No. 14 of 1904-15

Bangalore, the 12th September 1905.

WHEREAS an application, dated the 14th April 1915 and received on the 21st May 1915, has been submitted under Section 5 of the Mysore Inventions and Designs Regulation, 1894, by Mr William Charles Stephens Engineer of the Climax & Rock Drill & Engineering Works, Limited, Carn Brea, Cornwall, England

(hereinafter referred to as "the applicant") for leave to file a specification of an invention for "Improvements in Valve Gear for Rock Drilling and like Machines,"

And whereas the applicant has duly complied with all the requirements of Section 5 of the said Regulation;

The Government of Mysore are pleased, under Section 6 of the said Regulation, to authorize the applicant to file a specification of the said invention in accordance with the provisions of the said Regulation.

ORDERED, that the applicant be, and he is hereby, informed accordingly.

By Order of the Government of Mysore,

For Secretary to the Govt. of Mysore,
Gen. and Rev. Depts.

Certified that the fees prescribed in the fourth schedule to the Mysore Inventions and Designs Regulation, 1894, in respect of the application for leave to file the said specification and of the filing thereof have been paid by the applicant, and that the specification hereinbefore described has been duly filed in accordance with the provisions of Section 8 of the said Regulation on this the 11th day of October 1905.

For Secretary to the Govt. of Mysore,
Gen. and Rev. Depts.

(Section 8 of the Inventions and Designs Regulation, 1894.)

8. (1) If within six months from the date of an order under Section 6, Sub-Section (1), or within such further time, not exceeding three months, as the Government of Mysore, in its discretion, may, on cause shown to its satisfaction and on payment of the fee prescribed in that behalf in the fourth schedule, see fit to allow, the applicant causes a specification of his invention to be filed in manner by this Part required, and the fee prescribed in the fourth schedule in respect of the filing of the specification to be paid, the applicant shall, subject to the other provisions of this Part, be entitled to the exclusive privilege of making, selling and using the invention in the Territories of Mysore, and of authorizing others so to do, for a term of fourteen years from the date of the filing of the specification.

(2) But an exclusive privilege in respect of an invention of a new manufacture shall, notwithstanding anything in Sub-Section (1), cease, if the inventor fails to pay, within the time limited in that behalf by the fourth schedule, any fee prescribed in that schedule in respect of the continuance of the privilege.

(3) If, nevertheless, in any case, by accident, mistake, or inadvertence, an inventor fails to pay any such fee within the time so limited, he may apply to the Government of Mysore for an enlargement of the time for making the payment.

(4) Thereupon the Government of Mysore may enlarge the time accordingly, on payment of the fee prescribed in that behalf in the fourth schedule, and subject to the following conditions, namely :—

- (a) the time for making a payment shall not in any case be enlarged for more than three months ; and
- (b) if any suit is instituted in respect of an infringement of the exclusive privilege committed after a failure to make a payment within the time limited for the making thereof and before the enlargement of that time, the Court disposing of the suit may, if it thinks fit, refuse to award or give any damages in respect of the infringement.

SUBJECT.....

Diary No. of letter replied to 10661Section *pen: mis*File No. *441-14*Serial No. *9*

General and Revenue Secretariat

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191

No. G3499*me*Date of issue 13/9/15

To

Messrs De Penning & De Penning,

Signed by

*3, Commercial Buildings,**Chive Street, Calcutta.**Gentlemen,**With refce to your letter**no. 401, dated the 28th May, 1915,**I am directed to forward herewith**G.O. no. G3498 dated the 13.9.15**fm 441-14-8**authorising Mr. William Charles**Stephens, Engineer of the Climax**Rock Drill & Engineering Works Ltd,**Carin Brea, Cornwall, to file a**over.**W.L.L.
10/9*

a specification of his invention for
"Improvements in Valve Gear for
Rock Drilling and like Machines"
and to request that the fact may
be communicated to the party concerned.

I have re,

Ass
669
For Secretary Wfnt, ~~Handwritten signature~~
G. E. Deht
65 7/9/15

List of enclosures.

Copied by

Examined by

V 143
7/10/15
Rs. 30/- need to money order
on 11-10-15
9-11-15
letter to
17/11/15

3, Commercial Buildings
olive Street
Calcutta

30th September 1915.

No. 408.

3179

915-1916
IN file: 915
441-14
10

To

The Secretary to the Government of Mysore
General Department

Sir,

We have the honour to forward under separate cover registered the Specification of William Charles Stephens, Engineer, of the Climax Rock Drill and Engineering Works Limited, Barn Burn, Cornwall, England (and copies thereof) of his invention for "Improvements in Valve Gear for Rock Drilling and like Machines" and shall feel obliged by the enclosed certificate being completed and returned to us in due course.

We also forward through the Post Office, Money Order for Rs 30/-/- the fee due for filing the above Specification

We have the honour to be

Sir,

Your most obedient servants
De Penning - De Penning

Rs 30/- on 11-10-15.

TO THE DEWAN OF MYSORE.

The Application of WILLIAM CHARLES STEPHENS, Engineer, of The Climax Rock Drill & Engineering Works, Limited, Carn Brea, Cornwall, England, for leave to file a Specification under Part 1 of the Mysore Inventions and Designs Regulation, 1894.

1. The Applicant is in possession of an Invention for "IMPROVEMENTS IN VALVE GEAR FOR ROCK DRILLING AND LIKE MACHINES" he is the inventor thereof; and to the best of his information and belief, the Invention is new within the meaning of part 1 of the Mysore Inventions and Designs Regulation 1894, and no circumstance exists which, if the applicant is authorised to file a Specification, and files it in accordance with that part, will disentitle him to an exclusive privilege thereunder in respect of the Invention.
2. The Applicant has applied for a Patent (with Provisional Specifications) in the United Kingdom in respect of this Invention No. 16035 dated the 4th July 1914 (see Illustrated Official Journal No. 1329, page 978) which Specification was accepted on the 12th July 1914 No. 23434 dated the 2nd December 1914 (see Illustrated Official Journal No. 1351, page 1617) which Specification was accepted on the 10th December 1914 and No. 76 dated the 2nd January 1915 (see Illustrated Official Journal No. 1355, page 4) which Specification was accepted on the 14th January 1915. and a Complete Specification embodying the said three cognate applications was filed on the 4th February 1915
3. The following is a description of the Invention:-

My invention relates to valve gear especially applicable for use in connection with rock drilling machines of the hammer type (but also applicable to similar engines or machines for other purposes), the object of my invention being to simplify the construction of the valve and the ports for the admission and escape of the driving fluid, whereby the efficiency of the machine is improved.

In the machine constructed according to my invention the distributing valve is preferably arranged so that it moves in axial alignment with the hammer, the chest in which the valve works being placed at the rear end of the cylinder and being advantageously covered and held in position by a casing provided with a cock for controlling the air supply; if desired, however, the valve chest may be arranged without the casing and the air tap connected direct to the valve chest or fixed in any other suitable position on the cylinder.

The valve is provided with collars and grooves which co-operate with ports in the valve chest, and the said valve is made hollow and adapted at its rear end to slide upon a spill or stud fixed in the valve chest, and which spill serves for differentiating the area of the surfaces against which the air pressure operates at the front and rear of the valve, to an extent determined by the cross sectional area of the said spill or stud.

My invention will be readily understood by reference to the accompanying drawings, in which:-

Figure 1 is a sectional side view of a rock drilling machine provided with a valve arranged in accordance with my invention, the valve being shown in position for admitting air to drive the piston forwards.

Figure 2 is a sectional view of the rear portion of the drill but in a plane at right angles to the section in figure 1.

Figures 3, 4, 5 and 6 are sections on the lines 3-3, 4-4, 5-5, and 6-6, respectively, of figures 1 and 2.

Figures 7 and 8 are elevations respectively, of the valve shown in figures 1 and 2 and of the spill upon which it slides

Figure 9 is a view similar to figure 1, but showing the valve and piston in the forward position.

Figure 10 is a sectional view of the rear end of the drill shown in figure 9, the plane of the section being at right angles to the plane of the section in the said latter figure.

Figure 11 is a view similar to the rear end of figure 1 but illustrating a different arrangement for operating the valve by the air pressure.

Figures 12 and 13 are views similar to figure 11 illustrating further modifications.

Referring to the arrangement shown in figures 1 to 10, a indicates the working cylinder of the drill, a¹ the rear cover thereof, b the valve-chest and b¹ a casing which covers part of the said chest and which is provided with a cock b² for regulating the air supply, the said cylinder, cover, valve-chest and casing being held in position by longitudinal bolts c, c which also extend through the front cover of the cylinder in a manner which is well known and will be readily understood.

d is the hammer piston which reciprocates in the cylinder a, and e is the valve for distributing the air and which valve co-operates with ports formed in the valve-

chest b. e¹ is the spill or stud upon which the valve e slides, and which, as shown, is provided with a rear flange seated in a recess in the end of the valve-chest b.

f, f are passages formed in the valve-chest b, which passages open into a space f⁰ in communication with the air supply passage f¹ through the cock b², and which passages open into the interior of the said valve-chest through ports g, g¹. h is another port formed in the valve-chest and which is in communication, through the passage h¹ (figures 1, 5 and 6) in the valve-chest b, the cover a¹ and the cylinder a, with the port h² at the front end of the cylinder.

i is a port or opening which establishes communication between the interior of the valve-chest b and the interior of the cylinder a behind the piston d, and i, i are exhaust ports formed in the cylinder a and through which and the passages i¹, i¹ the two ends of the cylinder are alternately placed in communication with the atmosphere.

In practice the passages h¹ and i¹ are advantageously formed by drilling holes in the cylinder a cover a¹ and valve-chest b and the ports by cutting slots with circular cutters moved laterally from the centre of the valve-chest and of the cylinder, respectively, until they intersect the respective passages.

The valve e is formed with three ribs or collars k, k¹, k² and with intermediate grooves l, l¹, which collars and grooves serve to separate or place the several ports and passages in communication in a manner hereinafter described.

m is a passage formed through the spill or stud e and which serves to place the recess m¹ in the valve in constant communication with the air supply passage f¹. n is a small passage which establishes permanent communication between one of the air supply passages f (figure 5) and the rear end of the cylinder a, o, o are ports which place the space behind the valve e between the latter and the flange of the spill e¹ in permanent communication with the exhaust passages j¹ through the groove o¹ and p, p are ports which place the interior of the valve-chest in permanent communication with the said exhaust passages j¹ through the groove p¹.

g is a port which serves to place the space, through which the front or hammer portion of the piston d slides, in constant communication with the atmosphere to prevent compression and suction as the said piston reciprocates.

The operation of the apparatus hereinbefore described is as follows:- When the valve e is in its rearward position, as shown in figures 1 and 2, the port g¹ is uncovered to admit compressed air to drive the piston d forwards, whilst the port h is also uncovered and placed in communication with the port p so that when the piston d has moved forwards sufficiently far to cover the main exhaust port j, the air in front of the piston will be driven out through the port h², the passage h¹, the port h and the supplementary exhaust passages p. When during the forward movement of the piston d the latter has uncovered the exhaust ports j, as shown in figures 9 and 10, so that the rear end of the cylinder a is in communication with the atmosphere the lowering of pressure behind the piston will allow the live air, which acts on the rear

face of the valve, by entering the recess m¹ in the latter through the passage m in the spill e¹, to reverse the valve whereby the port g¹ will be closed by the collar k of the said valve and the port h cut off from communication with the ports p by the collar k¹ and placed in communication with the live air port g through the groove l¹ with the result, that the live air will pass through the ports g and h, passage h¹ and port h² to drive the piston backwards. As the piston moves rearwardly and after it has covered the exhaust port j the air behind the said piston is compressed, the pressure of the air being at the same time increased owing to the leak of air through the passage n, with the result, that the air pressure acting upon the front of the valve e which front is of larger area than the portion exposed to the air pressure at the rear of the valve, will again move the valve rearwardly to the position shown in figures 1 and 2 to shut off the air supply to the front of the cylinder and to again admit air through the port i, when the series of operations hereinbefore described will be repeated.

It will be understood that during the backward movement of the piston d the air at the rear end of the cylinder a is not exhausted, but compressed, whereby not only is the valve operated but a cushion is formed at the rear of the hammer.

Owing to the connection of the space between the back of the valve e and the spill e¹ with the exhaust through the passages o the compression of air in the said space or a leakage of live air cannot take place to check the rearward movement against the pressure acting on the valve in the recess m¹.

The arrangement of my invention illustrated in figure 11 differs only from that hereinbefore described in that, instead of admitting air into the valve e for moving it in one direction, the air acts upon the rim of the said valve around the spill e¹. To allow of this taking place a passage r is formed in the rear collar k² of the valve so as to allow the live air which enters the groove l¹ from the port g to pass behind the valve. Another passage s is also formed to place the recess m¹ within the valve e in communication with the exhaust ports p through the groove l.

In the arrangement of my invention hereinbefore described the groove l¹ of the valve e is permanently in communication with the live air supply, whilst the groove l is permanently in communication with the exhaust.

In the modification of my invention illustrated in figure 12, the valve e is constructed with a single groove t only, which alternately serves for the supply and for the exhaust. When the valve is in the position shown in the said figure, the said groove t is in a position in which the port h is in communication with the exhaust. When, however, the valve moves forward to close the port g, the exhaust passage p is also closed and a port u in the valve-chest b in communication with the passages f of the live air supply is placed in communication with the port h to admit live air to the front of the piston.

I sometimes modify the means for admitting air as follows and as illustrated in figure 13, that is to say, instead of employing a port u in the valve-chest as des-

cribed in the last modification, to allow the air to enter the groove t, I dispense with this port and I form a series of holes or passages y, y through the valve itself in the bottom of the said groove t, so that when the valve is in its forward position the said holes will be uncovered by the spill e¹ the air then entering the groove t and passing thence through the port h to the front end of the cylinder a, whilst when the valve is forced backwards by the compression as before described, to the position shown in figure 13, the holes y will be covered up and the port h will be in communication with the exhaust through the ports p.

Although I have described my invention as applied to a rock drill, it will be understood, that it can equally well be applied to rivetting and other similarly operating percussion tools.

Having now fully described and ascertained my said invention and the manner in which it is to be performed, I declare that what I claim is:-

1. In valve gear for rock drilling and like machines a hollow valve adapted to slide upon a spill or stud so that the area exposed to the air pressure on the rear side of the valve is less than that exposed to the air pressure at the front end by an amount equal to the cross sectional area of the spill or stud, substantially as described.
2. In a rock drilling or like machine, a hollow distributing valve sliding at one end upon a spill or stud, the recess in the said valve which receives the spill or stud being in communication with the atmosphere, whilst the air pressure which operates the valve acts upon the surface of the latter around the said spill or stud, substantially as described.
3. In a rock drilling or like machine, a hollow distributing valve sliding at one end upon a spill or stud and a passage formed through the spill or stud for admitting air into the recess in the said valve, the space around the spill or stud at the end of the valve being in communication with the atmosphere, substantially as described.
4. In a rock drilling or like machine provided with a hollow distributing valve sliding upon a spill or stud, the formation in the said valve of two grooves, one of which is permanently in communication with the live air supply and the other with the exhaust, substantially as described.

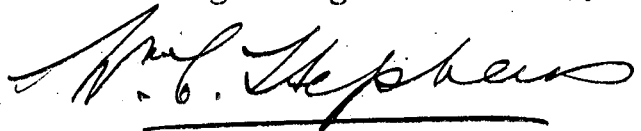
5. In a rock drilling or like machine provided with a hollow distributing valve sliding upon a spill or stud, the formation in the said valve of a single groove which is alternately placed in communication with the live air supply, and with the exhaust, substantially as described.

6. In a rock drilling or like machine provided with a hollow distributing valve sliding upon a spill or stud, the provision of means whereby the air for moving the piston of the machine in one direction is passed through the said stud and into the groove of the valve through holes in the said valve, substantially as described.

7. In a rock drill provided with a hollow distributing valve sliding upon a spill or stud and working in a valve chest arranged in axial alignment with the working cylinder of the machine, the arrangement of a casing enclosing the said valve chest and provided with a cock for connecting the air supply, substantially as described.

8. A rock drilling or like machine provided with a distributing valve sliding upon a spill or stud and operating in conjunction with ports, substantially in the manner hereinbefore described and illustrated in the accompanying drawings.

4. The Applicant, therefore, applies for leave to file a Specification of the Invention pursuant to Part I of the Mysore Inventions and Designs Regulation 1894.

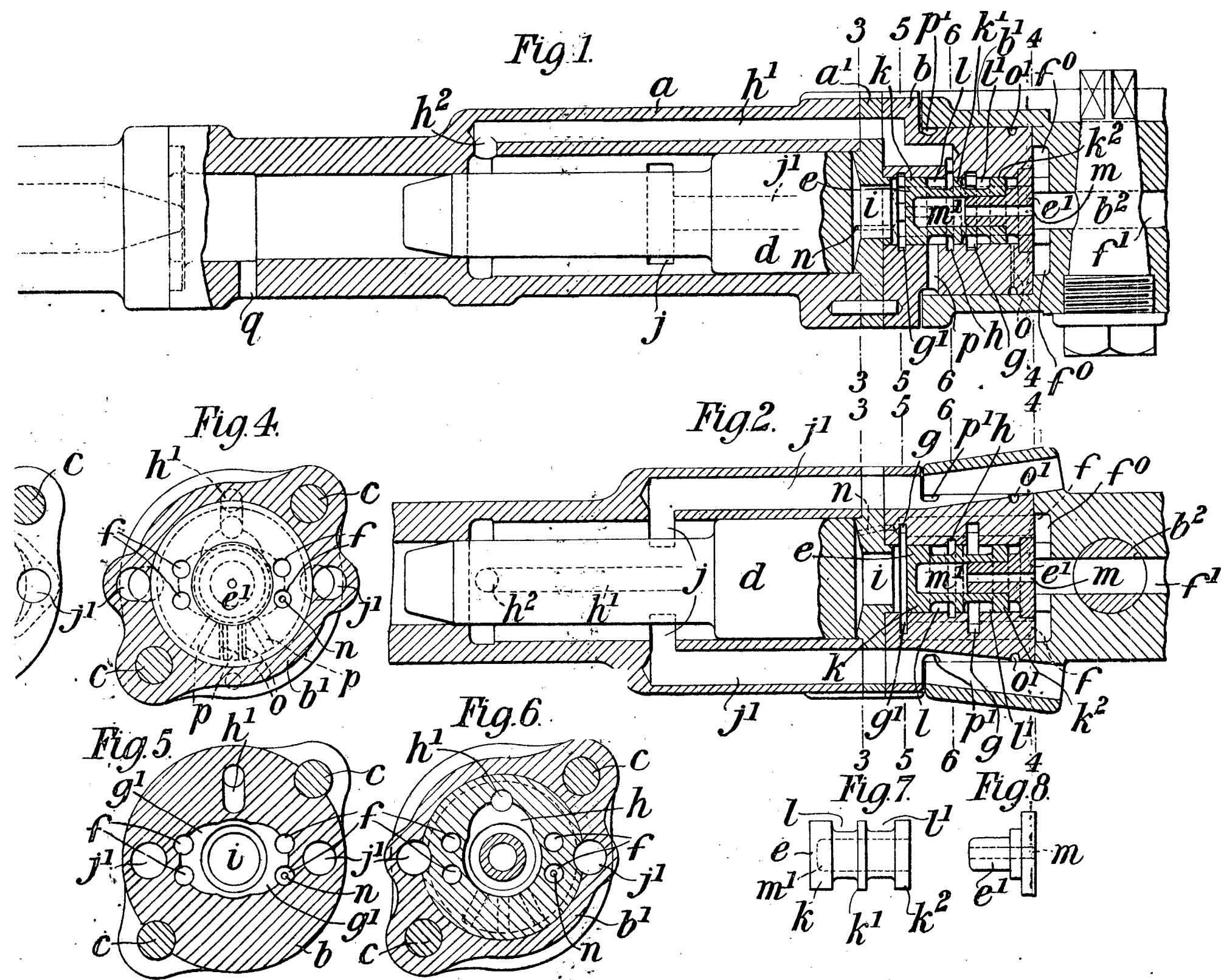


I, the applicant above named, do declare that the
(10)

facts stated in this application are true to my knowledge except as to matters stated on information and belief and as to those matters I believe them to be true.

W. B. Stephens

Dated this 14th day of April — 1915



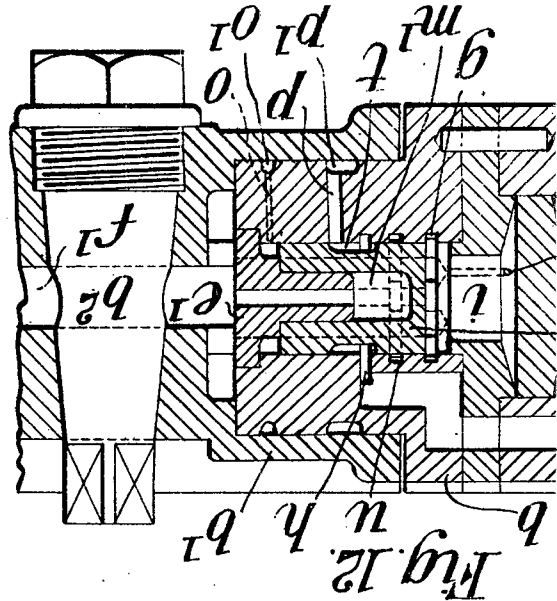


Fig. 12.

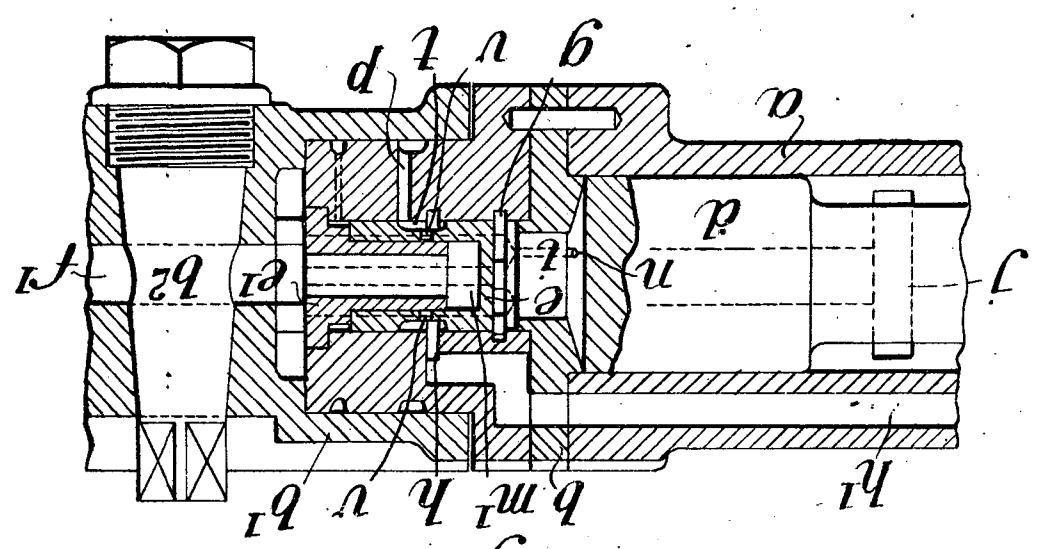


Fig. 13.

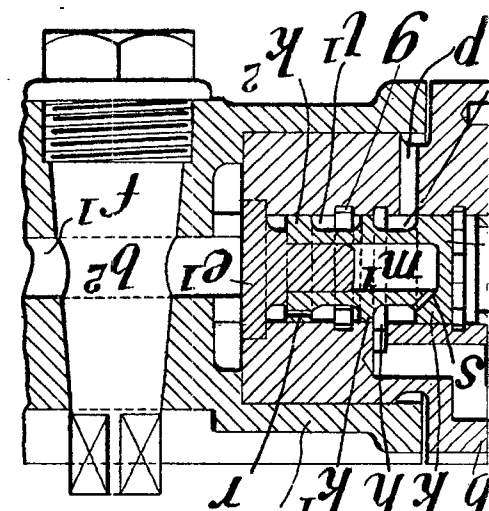


Fig. 11.

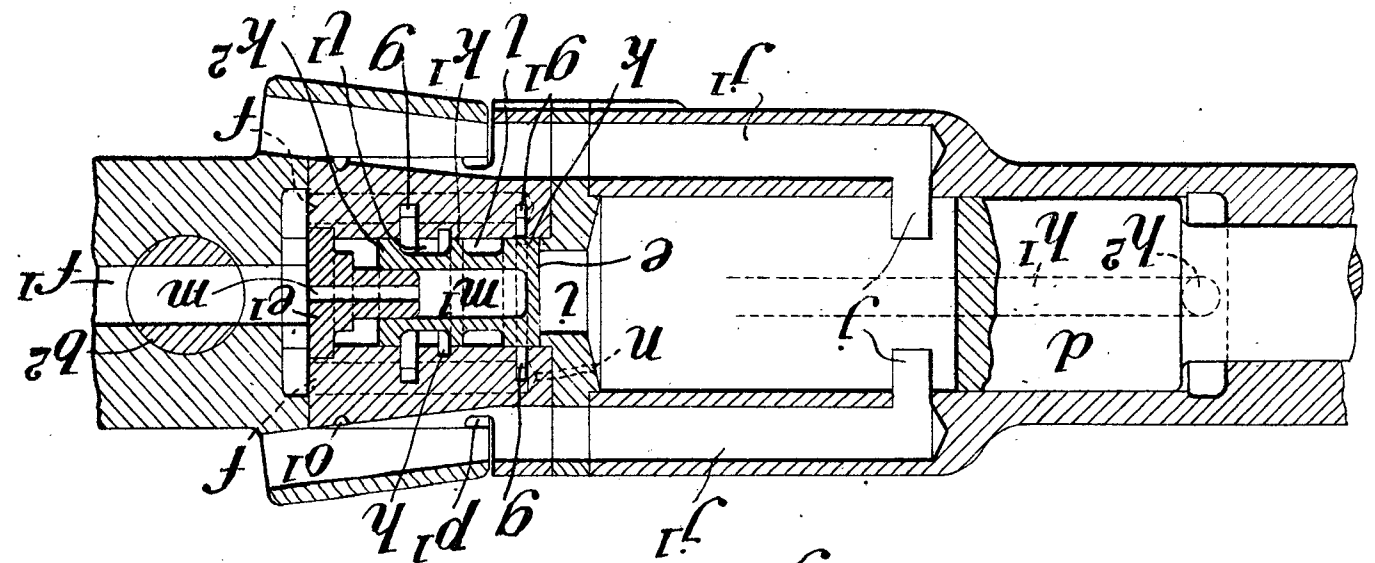


Fig. 10.

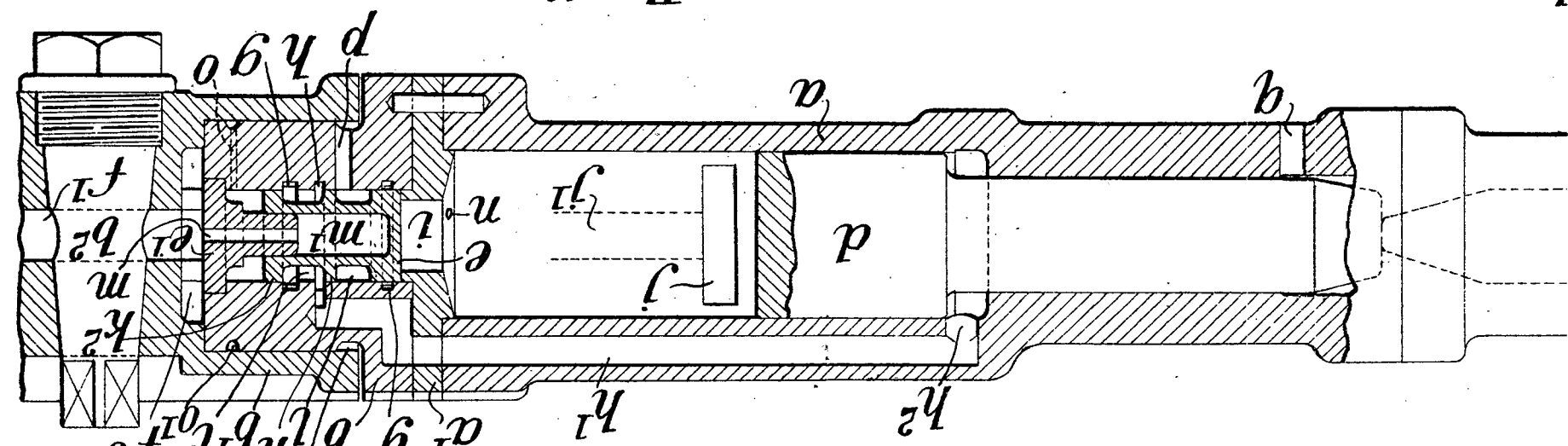


Fig. 9.

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SUBJECT.....

Diary No. of letter replied to 3179

Section Gen: Min

File No. 441-44

Serial No. //

General and Revenue Secretariat

()

, the

191

No. 6000/Rs 30

Date of issue 15-11-15

To The D.C. Hy Deptt., Bangalore.

Signed by Mr - M. S. R. Rao

for,

I am directed to forward herewith
a sum of Rs 30/- received from Messrs De
Penning & De Penning, Calcutta, being
fees payable under cl 2 Schedule IV
of the Mysore Inventions & Designs Regn
no XI of 1894, for filing a specification
of an invention for "Improvements
in Valve Gear for Rock Drilling and
like machines" by Mr William
Charles Stephens of Cornwall and

over.

Money Order
for 11/11/15

to request the favor of an acknowledgment

I have to,

Very truly,
Yours,

For Secretary of State

G. D. Bennett

List of copies of

Copied by

Examined by

No.

C 6001

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4815
pm 441-165
12/12

MYSORE GOVT, GEN. & REV. SECRETARIAT,

Dated Bangalore, 15th Nov 1905

NOTIFICATION.

(PATENT.)

The following specification of an invention has been filed in accordance with Sections 8, 9, 10 and 11 of Regulation XI of 1894 (The Inventions and Designs Regulations) and is open to inspection at the Mysore Government Secretariat on application to the Secretary to the Government of His Highness the Maharaja of Mysore, General and Revenue Departments, and on payment of a fee of one Rupee.

By Mr William Charles Stephens, Engineer of The
Climax Rock Drill and Engineering Works Limited, Carn Brea,
Cornwall, England,

"Improvements in valve gear for Rock
Drilling and like machines."

By Order,

dbl)

Msa

10/11

for Secretary. Genl

Gl Depto

The Compiler, Mysore Gazette, for publication.

for
12/11

No. 6002/bwo
Sm 461-14-13

MYSORE GOVT. GEN. & REV. SECRETARIAT;

Dated Bangalore, 15th Nov 1915.

From

The Secretary to the Government of H. H. the Maharaja of Mysore,
General and Revenue Departments.

To

Messrs De Penning & De Penning,
3, Commercial Buildings,
Clive Street, Calcutta

Sir, Gentlemen

With reference to your letter dated 30th Sept 1915, I am directed to forward copy of a Notification No. dated issued by this Government in regard to the invention filed by you under Regulation XI of 1894 (The Inventions and Designs Regulations.) and to request that the fact may be communicated to the party concerned.

The order granting permission to file specification is herewith returned, with the certificate at foot, duly filled in and signed.

I have the honor to be,

Sir, Gentlemen

Your most obedient servant,

etc)

MSR

10/11

In Secretary's Office

94 Dec 10

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SUBJECT.....

Diary No. of letter replied to 3179Section *gen*: *mis*File No. 441-14Serial No. 14

General and Revenue Secretariat

; the

191

No. G 60035 / *one*

Date of issue

15-11-15

Signed by

M. M. S. R. Rao

To

- (1) The Director of Mines & Geology
- (2) The Supdt, Govt Museum
- (3) " Chief Engineer of Mysore

Sir,

I am directed to forward herein
for record in your office copy of a spe-
cification of an invention for "Impro-
vements in Valve Gear for Rock Drilling
and like machines" by Mr. William
Charles Stephens of Cornwall &
to request the favour of an ac-
knowledgment.

I have to

Hon

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Subsecy to Govt

and El Dkt

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Mr V

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SE	No 160

Rs 30

Book No. 1060.1
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Bangalore District Treasury dated, 17th November 1915

Received from Secretary to Government of Mysore
General Department Bangalore

Paisas Thirty only

Annas _____ and Pies _____ being on account of

Tax payable under Cl. 2. Schedule IV of the Mysore
Inventions & Designs Regulation XI of 1894 received with
letter No. 10000 dated 15th Nov 15.

11-14-11

W

Ar. Lalil
In charge of Treasury.

Treasurer
Bangalore District Treasury

D.M.G. 12].

BANGALORE, 22nd Nov. 1915.

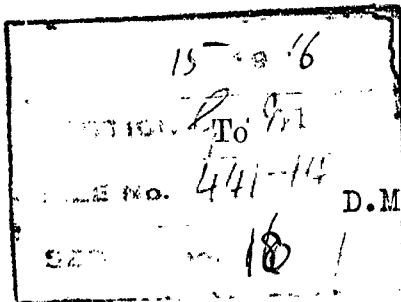
No. 1075.

FROM

DR. W. F. SMEETH, M.A., D.Sc., A.R.S.M., etc.,

*Director, Department of Mines and Geology,**Mysore State*

DIARY NO. 44/8



D.M. Narasinga Rao, Esquire, B.A., B.L.,

Secretary to the Government of His Highness

the Maharaja of Mysore,

General Department.

SIR,

I have the honour to acknowledge the receipt of a
 a copy of a specification of an invention for "Improvements in
 Valve Gear for Rock drilling and like machines" by Mr. William
 Charles Stephens of Cornwall, forwarded with your letter
 No.G.6003-5/G.M.441-14-14, dated 15th November 1915, for
 record in this office.

I have the honour to be,

Sir,

Your most obedient servant,

Director,

Department of Mines & Geology.

No. 89

38

Mysore Government Museum.
Bangalore. Dated 22nd November 1915.

From

DIARY No. 4416

The Superintendent,

Mysore Government Museum

B a n g a l o r e.

To

The Secretary to the Government

of His Highness the Maharaja of Mysore

General Department.

B a n g a l o r e.

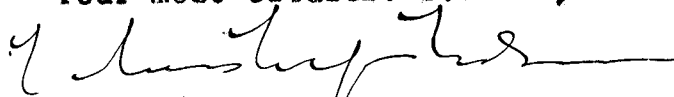
Sir,

I have the honor to acknowledge the receipt of copy of a specification of an invention for ' Improvements in Valve Gear for Rock drilling and like Machines ' by Mr. William Charles Stephens of Cornwall, forwarded with your letter No. G6008-5/G.M.441-14-14, dated 15th November 1915.

I have the honor to be,

S i r,

Your most obedient servant,



Assistant Superintendent.

1805

From

The Superintendent
Govt Museum
Bangalore

To

The Secretary to the Govt.
of H. H. the Maharaja of Mysore
General Department
Bangalore

Dated

Despatched

Received

General No.

No.

Enclosure No.

Acknowledging receipt
of copy of a specification
of an invention for
"Improvements in a
gear for Rock drilling and
like machines" by William
Charles Stephens.

TELEGRAPHIC
ADDRESS:
Statewoks.

39

No. 12159,
GEN. & REV. SEC.
2 DEC 1916

MYSORE P. W. DEPARTMENT.

CENTRAL OFFICE,
Bangalore..... 2nd December 1916.

From **Rajasabhabhushana**

KARPUR SHRINIVASRAO, Esq., B.Sc., L.C.E.,

Chief Engineer of Mysore,

NO. 4878 Bangalore.

To

D.M. Varasinga Rao, Esq., B.A., B.L.,

Secretary to Government, General Department,

B a n g a l o r e.

Sir,

I have the honour to acknowledge the receipt of a copy of specification of an invention for "Improvements in valve Gear for Rock Drilling and like machines", filed by Mr. William Charles Stephens of Cornwall, forwarded with your letter No. G.6003-5/G.M.444-14-14 dated the 15th November 1915.

I have the honour to be,

S i r,

Your most obedient servant,

W.R.R.

R. Sundaram
Deputy Chief Engineer of Mysore.

191 .

MYSORE P. W. DEPARTMENT.

No.

From

THE CHIEF ENGINEER OF MYSORE.

Bangalore.

To

Dated Bangalore

Despatched

Enclosure No.

SUBJECT.